

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Multiply fractions with prime factorization

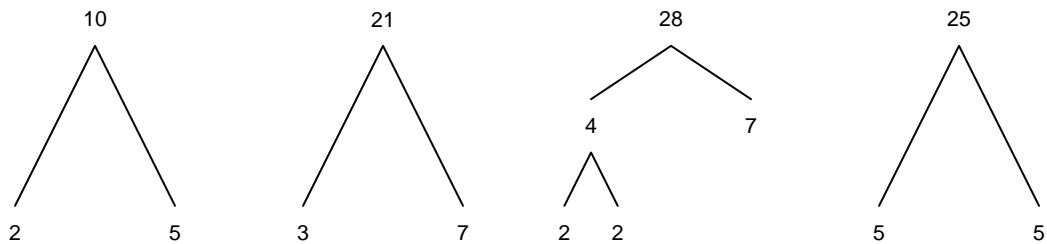
### Example 1

Using prime factorization, evaluate the product of two fractions shown below. Give your answer as a reduced fraction (not a mixed number).

$$\frac{10}{21} \cdot \frac{28}{25}$$

### Solution to example 1

First, use factor trees to determine the prime factorization of each number.



$$10 = 2^1 \cdot 5^1$$

$$21 = 3^1 \cdot 7^1$$

$$28 = 2^2 \cdot 7^1$$

$$25 = 5^2$$

Rewrite the fraction using prime factors. Also, remember  $\frac{a}{b} \cdot \frac{c}{d} \equiv \frac{ac}{bd}$ .

$$\frac{2 \cdot 5 \cdot 2 \cdot 2 \cdot 7}{3 \cdot 7 \cdot 5 \cdot 5}$$

Eliminate common factors.

$$\frac{2 \cdot \cancel{5} \cdot 2 \cdot 2 \cdot \cancel{7}}{3 \cdot \cancel{7} \cdot \cancel{5} \cdot 5}$$

$$\frac{2 \cdot 2 \cdot 2}{3 \cdot 5}$$

Multiply the factors in the numerator, and multiply the factors in the denominator.

$$\frac{8}{15}$$

## Practice 1

- Consider the product of fractions shown below.

$$\frac{39}{20} \cdot \frac{56}{65}$$

- Make factor trees for 39, 20, 56, and 65.
- Rewrite the problem using prime factors and a single fraction.
- Simplify by eliminating common factors.

## Practice 2

- Consider the product of fractions shown below.

$$\frac{15}{8} \cdot \frac{4}{33}$$

- Make factor trees for 15, 8, 4, and 33.

- Rewrite the problem using prime factors and a single fraction.

- Simplify by eliminating common factors.

## Practice 3

- Consider the product of fractions shown below.

$$\frac{63}{10} \cdot \frac{25}{189}$$

- Make factor trees for 63, 10, 25, and 189.
- Rewrite the problem using prime factors and a single fraction.
- Simplify by eliminating common factors.

## Practice 4

- Consider the product of fractions shown below.

$$\frac{26}{15} \cdot \frac{18}{65}$$

- Make factor trees for 26, 15, 18, and 65.
- Rewrite the problem using prime factors and a single fraction.
- Simplify by eliminating common factors.

## Practice 5

- Consider the product of fractions shown below.

$$\frac{55}{12} \cdot \frac{9}{22}$$

- Make factor trees for 55, 12, 9, and 22.

- Rewrite the problem using prime factors and a single fraction.

- Simplify by eliminating common factors.

## Practice 6

- Consider the product of fractions shown below.

$$\frac{12}{55} \cdot \frac{65}{6}$$

- Make factor trees for 12, 55, 65, and 6.

- Rewrite the problem using prime factors and a single fraction.

- Simplify by eliminating common factors.

## Practice 7

- Consider the product of fractions shown below.

$$\frac{65}{9} \cdot \frac{15}{26}$$

- Make factor trees for 65, 9, 15, and 26.

- Rewrite the problem using prime factors and a single fraction.

- Simplify by eliminating common factors.